What is claimed is:

1.

A process for fabricating ohmic contacts in a field-effect transistor, the transistor comprising a layered semiconductor structure which includes:

a) a group III nitride compound first semiconductor layer having a first band gap and doped with a charge carrier; and

b) a group III nitride compound second semiconductor layer having a second band gap that is less than said first band gap and positioned below said first semiconductor layer to generate an electron gas in said semiconductor structure,

the process including the steps of:

i) thinning the first semiconductor layer, forming recessed portions in said first semiconductor layer;

ii) depositing ohmic contacts over said recessed portions; and

iii) heating said deposited ohmic contacts,

whereby, after the heating step, said ohmic contacts communicate with said electron gas.

2.

The process of claim 1, wherein said first semiconductor layer comprises aluminum gallium nitride (AlGaN) and said second semiconductor layer comprises gallium nitride (GaN).

3.

The process of claim 1, wherein said ohmic contacts comprise titanium, aluminum, nickel and gold.

4.

The process of claim 3, wherein said ohmic contacts comprise 6% titanium, 65% aluminum, 13% nickel, and 16% gold.

5.

The process of claim 1, wherein said step of thinning the first semiconductor layer is performed through a reactive ion etching (RIE) process.

6.

The process of claim 5, wherein said reactive ion etching (RIE) process employs chlorine (Cl_2).

7.

The process of claim 6, wherein said reactive ion etching process (RIE) thins the first semiconductor layer according to a linear function of time.

8.

The process of claim 7, wherein said reactive ion etching (RIE) process has an etching time of about 45 seconds.

9.

The process of claim 1, wherein said ohmic contacts are source ohmic contacts.

10.

The process of claim 1, wherein said ohmic contacts are drain ohmic contacts.

11.

The process of claim 1, wherein said ohmic contacts are heated at a temperature of

about 875 °C.

12.

The process of claim 1, wherein said recessed portions in said first semiconductor layer have a thickness corresponding to 2/3 of the thickness of said first semiconductor layer.

13.

The process of claim 12, wherein the thickness of said recessed portions is about 200 Angstrom.

14.

The process of claim 1, wherein said ohmic contacts are made of a metal system comprising a plurality of metals, and wherein the step of heating alloys said ohmic contacts.

15.

The process of claim 14, wherein said metal system comprises titanium, aluminum, nickel and gold.

16.

The process of claim 1, wherein the field-effect transistor is a heterojunction field-effect transistor (HFET).

17.

In a layered semiconductor structure including

a) a group III nitride compound first semiconductor layer having a first band gap and

doped with a charge carrier; and

b) a group III nitride compound second semiconductor layer having a second band gap that is less than said first band gap and positioned below said first semiconductor layer to generate an electron gas in said semiconductor structure,

the improvement comprising said first semiconductor layer having selectively thinned portions.

18.

The structure of claim 17, wherein the selectively thinned portions of the first semiconductor layer comprise recessed portions.

19.

The structure of claim 18, wherein ohmic contacts are deposited in said recessed portions.

20.

The structure of claim 19, wherein said ohmic contacts are heated to communicate with said electron gas.

21.

The structure of claim 17, wherein said first semiconductor layer comprises aluminum gallium nitride (AlGaN) and said second semiconductor layer comprises gallium nitride (GaN).

22.

The structure of claim 17, wherein the thinned portions are formed through a reactive ion etching (RIE) process.

23.

The structure of claim 22, wherein said reactive ion etching (RIE) process employs chlorine (Cl_2).

24.

The structure of claim 23, wherein said reactive ion etching process (RIE) thins the first semiconductor layer according to a linear function of time.

25.

The structure of claim 24, wherein said reactive ion etching process (RIE) has an etching time of 45 seconds.

26.

The structure of claim 25, wherein the layered semiconductor structure forms a field-effect transistor.

27.

The structure of claim 26, wherein the field-effect transistor is a heterojunction field-effect transistor (HFET).

28.

A field-effect transistor comprising:

a) a group III nitride compound first semiconductor layer having a first band gap and doped with a charge carrier;

b) a group III nitride compound second semiconductor layer having a second band gap

that is less than said first band gap and positioned below said first semiconductor layer to generate an electron gas in said semiconductor structure; and

c) ohmic contacts to be heated, said ohmic contacts being located over recessed portions of said first semiconductor layer before being heated and communicating with said electron gas after having been heated.

29.

The field-effect transistor of claim 28, wherein said ohmic contacts are made of a metal system comprising a plurality of metals, and wherein heating of the plurality of metals alloys said ohmic contacts.

30.

The field-effect transistor of claim 29, wherein said metal system comprises titanium, aluminum, nickel and gold.

31.

The field-effect transistor of claim 30, wherein said metal system comprises 6% titanium, 65% aluminum, 13% nickel and 16% gold.

32.

The field-effect transistor of claim 28, said field-effect transistor being a heterojunction field-effect transistor (HFET).